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THE NEW WORLD SPECIES OF CINNAMOMUM Trew (Lauraceae).

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SUMMARY

1. The American species of *Phoebe* Nees are relegated to *Cinnamomum* Trew; the reasons for this transfer are discussed.
2. To retain nomenclatural stability the new combinations which have become necessary are presented, in anticipation of a general revision of the genus *Cinnamomum*; 68 new combinations and names are presented.

ACKNOWLEDGEMENTS

Although I already suggested in 1957, that the New World species of *Phoebe* might belong to the genus *Cinnamomum*, a final decision had to be postponed, until I could examine the available material of these species.

This became possible in 1959, thanks to a generous grant of the Ford Foundation (through the collaboration of Mr. Michael Harris, Representative of the Ford Foundation in Djakarta) permitting me to study in the United States of America.

I here express again my gratitude to the sponsours of this study tour and to all those, who collaborated to make it successful.

CINNAMOMUM TREW AND PHOEBE NEES

The New World species of *Phoebe* Nees have taxonomically always been in an unsatisfactory position, as is evident from their constantly changing classification.

Nees (Syst. Laur. 116. 1836), although not giving nomenclatural status to the two groups, was well aware of their differences, especially in the development of the perianth in the fruiting stage; in the Asiatic species a fruit cup is almost completely lacking and the erect tepals enlarge, harden and clasp the base of the fruit tightly; in the American ones on the contrary the cup is well- developed (although shallow in those species, where this part becomes fleshy and considerably thickened); the tepals either drop or remain (partly or completely) in a shrivelled condition at the cup-margin and the fruit pedicel is as a rule fleshy and thickened.

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The flowers do not show any differential characters and are in both groups similar to those of *Persea* and *Cinnamomum*.

In his tribus *Phoebeae*, Nees (l.c. 93) arranged side by side *Apollonias* and *Phoebe*, the former differing from the Asiatic species of *Phoebe* only by the reduction of the number of anther cells to two. The tribus *Phoebeae* itself was considered to be closely related to *Cinnamomum*. As is evident in my papers on Lauraceae, I support this viewpoint.

Meissner (in DC., Prodr. 15 (1) : 4, 29, 33. 1864) went a step further and coined the subgenus *Persoideae* for the Asiatic and the subgenus *Cinnamomoideae* for the American species of *Phoebe*. His chosen names for the two subgenera are significant.

Baillon's (Hist. Pl. 2: 468. 1872) treatment of *Phoebe* is distinctly inferior, the two groups are mixed up and their characters stated in an unsatisfactory and misleading way.

Bentham (in Benth. & Hook. f., Gen. Pl. 3: 156. 1880) incorporated *Phoebe* (with a score of other Neesian genera) in *Persea*, dismissing the fruit characters as of no or minor importance.

As I have stressed in my revision of the Lauraceae, the closely knit genera of Lauraceae can only be separated on minor characters, which however, yield good natural groups. Like Meissner, I have been of the opinion that the character of the flowertube as expressed in the fruit represents a very usefull and natural one for classification. Minor characters, like the number of anther cells are by no means artificial ones, as a reduction of the number from 4 to 2 has been demonstrated many times. Of course it is a matter of convenience to accept the groups based on such minor characters as genera or subordinate groups.

It should be kept in mind, however, that as a rule these minor characters are correlated with leaf characters, which so far have been discovered only by the experienced eye, but might well be based on anatomical differences.

Bentham's separation of *Apollonias*, which is so close to Asiatic *Phoebe* is certainly not warranted.

Under *Persea*, the two groups of *Phoebe* were carefully kept separate by Bentham, the Old World ones as the subgenus *Phoebe*, the New World ones as *Gnesiopersa*. For some obscure reason (perhaps geographical?), he included in § *Gnesiopersea* also *Persea indica* (L.) Spr., which caused Pax (in Engl. & Prantl, Nat. Pflanzenfam. 3 (2) : 115. 1889) to relegate this species to *Phoebe*.

Pax followed Bentham's classification, merely changing the subgeneric name *Phoebe* Benth. to *Euphoebe* Pax.

Mez (in Jahrb. bot. Gart. Berlin 5: 5 et 180. 1889) did not discuss the Old World species of *Phoebe*, restricting himself to the American ones, which he considered to be closely related to *Persea*. It is amazing that, to separate *Persea* and *Phoebe*, he considered the weak and unreliable character of the position of the anther cells to be of more importance than the characters of the perianth after anthesis. This may be attributed partly to the lack of fruit in most of his material; nevertheless he mentioned the presence of a fruit cup and a thickened pedicel in *Phoebe*.

In Communication Forest Research Institute Bogor 57: 35. 1957 (also in Reinwardtia 4: 227. 1957), I have already suggested, that American *Phoebe* might belong to *Cinnamomum* and after examining numerous specimens, I have now become fully convinced of this. Chevalier (in Comptes rend. Ac. Sci. Paris 187: 1153. 1928) arrived at the same conclusion.

Like in *Cinnamomum*, the American species of *Phoebe* have (more often than not) triplinerved leaves, which is not the case in Asiatic *Phoebe*. Many Asiatic *Cinnamomum* species have non-triplinerved leaves.

The leaves of all *Phoebe* species are spirally arranged, but this occurs also in *Cinnamomum*, although the typical group of *Cinnamomum* has opposite leaves.

Not much is known about the aromatic properties of American *Phoebe*, although at least one *(Phoebe effusa)* has the significant vernacular name: Canelito, but one should remember that half the species of Asiatic *Cinnamomum* are not aromatic.

A swollen, shallow fruit cup, combined with a swollen pedicel with remnants of tepals (partly or entire) is a common feature in Asiatic *Cinnamomum*.

The known anatomical properties of the wood do not prevent the fusion of American *Phoebe* with *Cinnamomum* (Stern in Trop. Woods 100: 24 et 31. 1954), although admittedly the number of species investigated is on the low side.

Mez divided American *Phoebe* in two subgenera: *Heteranthera* with 2- celled anthers of the third whorl and *Euphoebe* where all anthers are 4- celled. I have been able to observe that the same groups are encountered in Asiatic *Cinnamomum*.

By the presence of the *Heteranthera* group, *Cinnamomum* comes very close to the genus *Aiouea*, a fact which I have already stressed (Commun., l.c. 58; Reinwardtia, l.c. 250).

In order to maintain stability in specific epithets as far as possible, I give here the necessary recombinations for American *Phoebe*, in anticipation of an over-all revision of *Cinnamomum*.

So far 351 binomials have been published in *Cinnamomum*.

The characters according to which this large genus should be subdivided are: leaves spirally arranged or opposite, all anthers 4- celled or some whorls 2- celled and fruit cup fleshy with fleshy stalk or the cup normal.

1. **Cinnamomum acutatum** Kosterm., nom. nov. (base: *Phoebe acuminatissima* Lundell in Contr. Univ. Michigan Herb. 6: 19. 1941; because of *C. acuminatissimum* Hayata 1913 the specific epithet cannot be used).

2. **Cinnamomum amoenum** (Nees) Kosterm., comb. nov. (basionym: *Oreodaphne amoena* Nees in Linnaea 8: 44. 1833).

3. **Cinnamomum amplexicaulis** (Cham. & Schl.) Kosterm., comb. nov. (basionym: *Persea amplexicaulis* Chamisso & Schlechtendahl in Linnaea 5: 90. 1830).

4. **Cinnamomum amplifolium** (Mez & Donn. Sm.) Kosterm., comb. nov. (basionym: *Phoebe amplifolia* Mez & Donell Smith in Coult. Bot. Gaz. 19: 261, t. 24. 1894).

5. **Cinnamomum areolatum** (Lundell) Kosterm., comb. nov. (basionym: *Phoebe areolata* Lundell in Contr. Univ. Michigan Herb. 7: 13. 1942).

6. **Cinnamomum arsenei** (Allen) Kosterm., comb. nov. (basionym: *Phoebe arsenei* Allen in J. Arnold Arb. 26: 312. 1945).

7. **Cinnamomum barbeyanum** (Mez) Kosterm., comb. nov. (basionym: *Phoebe barbeyana* Mez in Jahrb. bot. Gart. Berlin 5: 209. 1889).

8. **Cinnamomum bourgeauvianum** (Mez) Kosterm., comb. nov. (basionym: *Phoebe bourgeauviana* Mez in Jahrb. bot. Gart. Berlin 5: 194. 1889).

9. **Cinnamomum brasiliensis** (Mez) Kosterm., comb. nov. (basionym: *Phoebe brasiliensis* Mez in Jahrb. bot. Gart. Berlin 5: 198. 1889).

10. **Cinnamomum brenesii** (Standley) Kosterm., comb. nov. (basionym: *Phoebe brenesii* Standley in Field Mus. Publ. Bot. 18: 459. 1937).

11. **Cinnamomum chiapensis** (Lundell) Kosterm., comb. nov. (basionym: *Phoebe chiapensis* Lundell in Contr. Univ. Michigan Herb. 6: 21. 1941).

12. **Cinnamomum chinantecorum** (Schultes) Kosterm., comb. nov. (basionym: *Phoebe chinantecorum* Schultes in Bot. Mus. Leaflets Harvard Univ. 9: 170, t. 3. 1941).

13. **Cinnamomum cinnamomifolium** (H.B.K.) Kosterm., comb. nov. (basionym: *Persea cinnamomifolia* H.B.K., Nov. Gen. 2: 160. 1817).

14. **Cinnamomum costaricanum** (Mez & Pittier) Kosterm., comb. nov. (basionym: *Phoebe costaricana* Mez & Pittier in Bull. Herb. Boissier, Sér. 2, 3: 230. 1903).

15. **Cinnamomum cubensis** (Nees) Kosterm., comb. nov. (basionym: *Phoebe cubensis* Nees, Syst. Laur. 120. 1836).

16. **Cinnamomum effusum** (Meissn.) Kosterm., comb. nov. (basionym: *Phoebe effusa* Meissner in DC., Prodr. 15 (1): 33. 1864).

17. **Cinnamomum ehrenbergii** (Mez) Kosterm., comb. nov. (basionym: *Phoebe ehrenbergii* Mez in Jahrb. bot. Gart. Berlin 5: 201. 1889).

18. **Cinnamomum elongatum** (Nees) Kosterm., comb. nov. (basionym: *Phoebe elongata* Nees, Syst. Laur. 116. 1836).

19. **Cinnamomum erythropus** (Nees, Mart. & Spix) Kosterm., comb. nov. (basionym: *Persea erythropus* Nees, Martius & Spix ex Nees in Linnaea 8: 49. 1833).

var. **ovatum** (Meissn.) Kosterm., comb. nov. (basionym: *Persea erythropus*, var. *ovata* Meissner in DC., Prodr. 15 (1): 55. 1864).

20. **Cinnamomum estrellensis** (Meissn.) Kosterm., comb. nov. (basionym: *Oreodaphne estrellensis* Meissner in DC., Prodr. 15 (1): 126. 1864).

21. **Cinnamomum falcatifolium** Kosterm., nom. nov. (base *Phoebe falcata* Mez in Urban, Symbol. 2: 251. 1900; non Miquel 1858).

22. **Cinnamomum glaziovii** (Mez) Kosterm., comb. nov. (basionym: *Phoebe glaziovii* Mez in Jahrb. bot. Gart. Berlin 5: 216. 1889).

23. **Cinnamomum hausknechtii** (Mez) Kosterm., comb. nov. (basionym: *Phoebe hausknechtii* Mez in Jahrb. bot. Gart. Berlin 5: 186. 1889).

24. **Cinnamomum helicterifolium** (Meissn.) Kosterm., comb. nov. (basionym: *Oreodaphne helicterifolia* Meissner in DC., Prodr. 15(1): ~~118~~. 1864).

25. **Cinnamomum heterantherum** (R. & P.) Kosterm., comb. nov. (basionym: *Laurus heteranthera* Ruiz & Pavon, Fl. Peruv. 4: t. 364 et Laurogr. t. 4. 1802).

26. **Cinnamomum heterotepalum** (Mez) Kosterm., comb. nov. (basionym: *Phoebe heterotepala* Mez in Fedde, Rep. 3: 67. 1906).

27. **Cinnamomum johnstonii** (Allen) Kosterm., comb. nov. (basionym: *Phoebe johnstonii* Allen in J. Arnold Arb. 26: 433. 1945).

28. **Cinnamomum longipes** (Johnst.) Kosterm., comb. nov. (basionym: *Phoebe longipes* I.M. Johnston in Contr. Gray Herb., N.S. 70: 69. 1924).

29. **Cinnamomum mathewsii** (Mez) Kosterm., comb. nov. (basionym: *Phoebe mathewsii* Mez in Jahrb. bot. Gart. Berlin 5: 217. 1889; *Persea punctata* Meissner, var. *mathewsii* Meissner in DC., Prodr. 15(1): 505. 1864).

30. **Cinnamomum maynensis** (Nees) Kosterm., comb. nov. (basionym *Phoebe maynensis* Nees, Syst. Laur. 118. 1836).

31. **Cinnamomum mexicanum** (Meissn.) Kosterm., comb. nov. (basionym: *Phoebe mexicana* Meissner in DC., Prodr. 15 (1): 31 1864).

32. **Cinnamomum microneurum** (Meissn.) Kosterm., comb. nov. (basionym: *Persea microneura* Meissner in DC., Prodr. 15(1): 53. 1864).

33. **Cinnamomum mollicellum** (Blake) Kosterm., comb. nov. (basionym: *Phoebe mollicella* Blake in Contr. Gray Herb., N.S. 52: 64. 1917).

34. **Cinnamomum mollis** (Mez) Kosterm., comb. nov. (basionym *Phoebe mollis* Mez in Jahrb. bot. Gart. Berlin 5: 192. 1889).

35. **Cinnamomum montanum** (Sw.) Berchthold & Presl, Priroz Rostlin 2: 36. 1825 (basionym: *Laurus montana* Sw., Prodr. Veg. Ind. occ. 65 1788).

36. **Cinnamomum neurophyllum** (Mez & Pittier) Kosterm., comb. nov (basionym: *Phoebe neurophylla* Mez & Pittier in Bull. Herb. Boissier, Sér 2, 3: 231. 1903).

37. **Cinnamomum obtusatum** (Lundell) Kosterm., comb. nov. (basionym: *Phoebe obtusata* Lundell in Contr. Univ. Michigan Herb. 6: 21 1949).

38. **Cinnamomum oleifolium** (Mez) Kosterm., comb. nov. (basionym *Phoebe oleifolia* Mez in Arb. bot. Gart. Breslau 1: 117. 1892).

39. **Cinnamomum padiformis** (Standl. & St.) Kosterm., comb. nov (basionym: *Phoebe padiformis* Standley & Steyermark in Field Mus. Publ Bot. 23: 117. 1944).

40. **Cinnamomum pallescens** (Mez) Kosterm., comb. nov. (basionym *Phoebe pallescens* Mez in Jahrb. bot. Gart. Berlin 5: 218. 1889).

41. **Cinnamomum paraguariensis** (Hassler) Kosterm., comb. nov. (basionym: *Phoebe paraguariensis* Hassler in Annuaire Conserv. et Jard. bot Genève 21: 79. 1919).

42. **Cinnamomum parviflorum** (Nees) Kosterm., comb. nov. (basionym *Phoebe parviflora* Nees, Syst. Laur. 120. 1836, in nota). The name: *C. parviflorum* Nees ex Baillon, Traité Bot. méd. 686. 1884 is an unintentional error and a misprint for *C. pauciflorum* Nees. *Phoebe parviflora* is a valid name, enumerated by Mez (1889) under his *Phoebe grisebachiana;* the latter name is consequently superfluous.

43. **Cinnamomum patens** (Meissn.) Kosterm., comb. nov. (basionym: *Mespilodaphne patens* Meissner in Warming, Symbol. 206 et in Vidensk Meddel. Köbnhavn 1870: 134).

44. **Cinnamomum mezii** Kosterm., nom. nov. (base: *Phoebe pauciflora* Mez & Taubert in Engl. bot. Jahrb. 17: 520. 1893, non Villar 1880).

45. **Cinnamomum pichisensis** (A. C. Sm.) Kosterm., comb. nov. (basionym: *Phoebe pichisensis* A.C. Smith in Bull. Torrey bot. Cl. 58: 103. 1931).

46. **Cinnamomum pittieri** (Mez) Kosterm., comb. nov. (basionym: *Phoebe pittieri* Mez in Engl. Jahrb. 30, Beibl. 67: 16. 1901).

47. **Cinnamomum porosum** (Nees & Mart.) Kosterm., comb. nov. (basionym: *Oreodaphne porosa* Nees & Martius in Linnaea 8: 44. 1833).

48. **Cinnamomum porphyrium** (Gris.) Kosterm., comb. nov. (basionym: *Nectandra porphyria* Grisebach, Pl. Lorentz. 96 in Goettinger Abhandl. 19: 144. 1874).

49. **Cinnamomum psychotrioides** (H.B.K.) Kosterm., comb. nov. (basionym: *Ocotea psychotrioides* H.B.K., Nov. Gen. 2: 129 [162]. 1817).

50. **Cinnamomum reticulifolium** Kosterm., nom. nov. (base: *Phoebe reticulata* Mez in Arb. bot. Gart. Breslau 1: 119. 1892); *Cinnamomum reticulatum* Hayata 1911 prevents the use of the specific epithet.

51. **Cinnamomum riedelianum** Kosterm., nom. nov. (base: *Persea riedelii* Meissner in DC., Prodr. 15(1): 54. 1864); *Cinnamomum riedelii* Lukmanoff 1889 prevents the use of the specific epithet.

52. **Cinnamomum salicifolium** (Nees) Kosterm., comb. nov. (basionym: *Phoebe salicifolia* Nees in Linnaea 21: 488. 1848).

53. **Cinnamomum salvini** (Mez) Kosterm., comb. nov. (basionym: *Ocotea salvini* Mez in Jahrb. bot. Gart. Berlin 5: 264. 1889).

54. **Cinnamomum selloviana** (Nees & Mart.) Kosterm., comb. nov. (basionym: *Persea selloviana* Nees & Martius in Linnaea 8: 50. 1833).

55. **Cinnamomum semecarpifolium** (Meissn.) Kosterm., comb. nov. (basionym: *Oreodaphne semecarpifolia* Meissner in DC., Prodr. 15(1): 120. 1864).

56. **Cinnamomum siltepecana** (Lundell) Kosterm., comb. nov. (basionym: *Phoebe siltepecana* Lundell in Wrightia 1(2): 151. 1946).

57. **Cinnamomum smithianum** Kosterm., nom. nov. (base: *Phoebe smithii* Allen in J. Arnold Arb. 26: 317. 1945); *Cinnamomum smithii* Lukmanoff 1889 prevents the use of the specific epithet.

58. **Cinnamomum stereophyllum** (Meissn.) Kosterm., comb. nov. (basionym: *Phoebe stereophylla* Meissner in DC., Prodr. 15(1): 29. 1864).

59. **Cinnamomum subsessilis** (Meissn.) Kosterm., comb. nov. (basionym: *Persea subsessilis* Meissner in DC., Prodr. 15(1): 54. 1864).

60. **Cinnamomum subtriplinervium** (Meissn.) Kosterm., comb. nov. (basionym: *Oreodaphne subtriplinervia* Meissner in DC., Prodr. 15(1): 125. 1864).

61. **Cinnamomum tampicensis** (Meissn.) Kosterm., comb. nov. (basionym: *Oreodaphne tampicensis* Meissner in DC., Prodr. 15(1): 136. 1864).

62. **Cinnamomum taubertianum** (Mez & Schw.) Kosterm., comb. no (basionym: *Phoebe taubertiana* Mez & Schwacke in Engl. Jahrb. 21: 42 1896).

63. **Cinnamomum quadrangulum** (~~Meissn.~~) Kosterm., nom. nov. (base *Oreodaphne tetragona* Meissner in Warming, Symbol. 209; in Videns Meddel. Köbnhavn 1870: 137); because of *C. tetragonum* Chevalier 191 the specific epithet cannot be used.

64. **Cinnamomum tomentulosum** (~~Meissn.~~) Kosterm., nov. nov. (base *Phoebe tomentosa* Meissner in DC., Prodr. 15(1): 30. 1864); because *C. tomentosum* D. Don 1825, the specific epithet cannot be used.

65. **Cinnamomum tonduzii** (Mez) Kosterm., comb. nov. (basionym *Phoebe tonduzii* Mez in Engl. Jahrb. 30, Beibl. 67: 15. 1901).

66. **Cinnamomum triplinervis** (R. & P.) Kosterm., comb. nov. (basi onym: *Laurus triplinervis* Ruiz & Pavon, Fl. Peruv. 4: t. 363 et Laurogr. 9. 1802).

67. **Cinnamomum valerianum** (Standley) Kosterm., comb. nov. (basi onym: *Phoebe valeriana* Standley in Field Mus. Publ. Bot. 18: 460. 1937).

68. **Cinnamomum vesiculosum** (Nees) Kosterm., comb. nov. (basionym *Oreodaphne vesiculosa* Nees in Linnaea 8: 44. 1833).